REMARKS

I. Introduction

Claims 1-38 were presented for examination. Claims 1-38 were rejected. Applicant is hereby amending claims 1-38. Support for the claim amendments is found in the specification as originally filed. Reconsideration of this application as amended, and allowance of all pending claims are hereby respectfully requested.

II. The Rejection Of Claims 1, 4-6, 11, 13-14, 19, and 32-35 Under 35 U.S.C. § 102

Claims 1, 4-6, 11, 13-14, 19, and 32-35 have been rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,445,739 issued to Shen et al. ("Shen"). The Applicants respectfully request reconsideration and allowance of the claims in view of the amendments presented herein and the following arguments.

Shen discloses a method for coding of a quantization matrix used in quantizing a corresponding discrete cosine transform (DCT) block. It is commonly known to a person skill in the art of coding that quantization is applied to uncompressed data to reduce the dynamic range of the data so that fewer bits are required to code the quantized data. Typically, prior to coding, a sample value to be coded is divided by a quantization parameter (or a quantization step multiplied by a quantization parameter as shown in Shen, col. 6, lines 5-9) to yield a quantized sample value. When a large quantization parameter is used, a quantized sample value may become zero after being rounded off. Such quantized data, when coded via, e.g., variable length coding, a significant saving on number of bits used to code such data may be achieved. This is especially true when a substantial portion of the quantized samples become zero. Therefore, by appropriately setting quantization parameters may lead to substantial reduction in bitrate.

Shen teaches a method to determine a quantization matrix that contains a plurality of quantization elements, each of which serves as a quantization parameter with respect to a DCT coefficient in a corresponding DCT block of the same dimension (see Figs. 1-3). In addition, Shen discloses a method to code/decode such a quantization matrix. According to Shen, a default quantization matrix is provided, which can be adjusted based on, e.g., image content or bitrate. Such adjustments may be made manually or automatically (see col. 5, lines 1-10). Furthermore, a predetermined number may be used to truncate a quantization matrix (see col. 5, lines 28-35). The effect of truncating a quantization matrix includes both on the quantized DCT coefficients as well as on how the quantization matrix is to be coded. For example, a larger quantization element makes corresponding quantized DCT coefficient more likely to become zero. In addition, when a sufficient number of quantized DCT coefficients along a scan direction, e.g., a zigzag direction, become substantially close to zero, corresponding quantization elements in the quantization matrix may be truncated (see col. 30-45). The truncated portion of a quantization may be neither coded nor transported and can be reconstructed later in a decoding process.

Since Shen teaches a method of dynamically determining the size and content of a quantization matrix, the disclosure involves data processing in an non-compressed domain. That is, during an encoding process, what Shen teaches is a method and system to process a quantization matrix with real numbers instead of processing a bitstream. This is illustrated in Fig. 4, where particular QM generator 38, default QM generator 46, and synthesized QM generator 44 generate matrices of real numbers (quantization parameters) and the output of synthesized QM generator 44 is also a matrix of real numbers to be used by a quantizer 34 to perform quantization on each DCT coefficient using a corresponding quantization element.

These operations occur prior to the quantized data (either the DCT block or the QM) being encoded to generate a bitstream. Therefore, Shen's method in relation to encoding operates in a non-compressed domain.

Similarly, during decoding, a quantization matrix of real numbers is reconstructed in a non-compressed domain for dequantization purpose (see Fig. 5, default QM generator 58 and synthesized QM generator 54). Even though the quantization matrix may be coded as a bitstream during transport, Shen's teaching relates to how to reconstruct a quantization matrix with real numbers in a non-compressed domain. Specifically, Shen teaches how to synthesize a former portion of the transported quantization matrix with a latter portion with default real numbers from the default QM generator 58 (see col. 5, lines 44-59). The synthesized QM generator 54 outputs a reconstructed quantization matrix to an inverse quantization unit IQ 52 that performs dequantization on uncompressed data (not a bitstream) generated by a variable length decoder 50 to reconstruct DCT blocks. Therefore, the disclosed invention in relation to decoding also operates in a non-compressed domain.

The amended independent claims 1, 4, 5, 11, 13-14, and 33-35 recite "bitstream transcoding" method / apparatus that take a bitstream as input and output a revised bitstream that is transcoded. Independent claims 1, 4, 5, 11, and 13-14 specifically recite "analyzing a bitstream ..." and "outputting said bitstream ...". In addition, independent claims 33-35 recite "analyzing an input bistream ..." and "producing ... a transcoded bitstream ...". That is, both the input to and the output from the claimed invention are bitstreams and the claimed invention operates in a compressed domain.

The Applicants respectfully submit that Shen fails to disclose or teach a method that takes a bitstream as input and generates a bitstream as its output, as recited in independent claims 1, 4-5,

11, 13-14, and 33-35. On the contrary, as discussed above, Shen teaches a method that operates in a non-compressed domain. It is commonly known, techniques processing data in a compressed domain differ in substance from techniques processing data in a non-compressed domain. Since Shen fails to disclose and teach those features as recited in claims 1, 4-5, 11, 13-14, and 33-35, the Applicants respectfully submit that Shen does not anticipate claims 1, 4-5, 11, 13-14, and 33-35. Therefore, claims 1, 4-5, 11, 13-14, and 33-35 are patentable.

Claim 6 depends from claim 5. Therefore, claim 6 is patentable at least for the reasons stated above with respect to claim 5 and for the additional features recited therein.

Claim 19 depends from claim 11. Therefore, claim 19 is patentable at least for the reasons stated above with respect to claim 11 and for the additional features recited therein.

Claim 32 depends from claim 1. Therefore, claim 32 is patentable at least for the reasons stated above with respect to claim 1 and for the additional features recited therein.

III. The Rejection Of Claims 17-18 Under 35 U.S.C. § 103

Claims 2-3, 7-8, 11-16, 19, 22-28, 30-31, and 36-38 have been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,445,739 issued to Shen et al. ("Shen") in view of U.S. Patent No. 6,310,919 issued to Florencio. The Applicants respectfully request reconsideration and allowance of the claims in view of the amendments presented herein and the following arguments.

In the Office Action, the Examiner correctly pointed out that "Shen fails to disclose having the inter-macroblock accompanied by predictive coding such as a motion vector" but asserted that "Florencio discloses that well-known inter coding techniques for transcoding according to MPEG include both motion compensation predictive P and B coding modes".

Florencio teaches a method in which an image is stored in a decoder buffer with a reduced image resolution and used in motion compensation. This is clearly illustrated in Figs. 4A, 4B, 5A, and 5B, where Fig. 4A shows an image with full resolution with an arrow representing a motion vector associated with the image. Fig. 4B shows the image as stored in a buffer with a reduced resolution, where an arrow in Fig. 4B indicates how a frame prediction based on the motion vector can be achieved using the stored image with a reduced resolution. Similarly, Fig. 5A shows an interlaced image in full resolution with an arrow representing a motion vector for field prediction. Fig. 5B shows the interlaced image as stored in its reduced resolution, where an arrow indicates how a field prediction can still be achieved in a reduced resolution situation. Fig. 1 shows that a motion compensator 116 and a MV processor 130 perform motion compensation on data from a VLD (variable length decoder) 112, which is known to convert a bitstream to generate uncompressed data form prior to motion compensation.

According to MPEP §2142, to establish a prima facie case of obviousness, there must be some suggestion or motivation to modify the reference or combine reference teachings. As discussed above, Shen discloses a method to determine quantization elements in a quantization matrix and the number of quantization elements to be coded. Shen does not suggest or have any motivation to suggest to modify the disclosed method or combine with Florencio's teaching, which relates to motion compensation performed in an image with reduced resolution. In addition, as discussed above, Florencio discloses a method that also operates in a non-compressed domain instead of performing motion compensation directly in a compressed domain.

Since Shen fails to disclose, teach, or suggest a method that operates in a compressed domain which takes a bitstream as input and generates a bitstream as output and there is no

suggestion or motivation in Shen to combine with Florencio, a prima facie case of obviousness can not be established. In addition, even if combined, the combination of Shen and Florencio does not remedy the deficiency of Shen because such a combination still fails to teach a "bitstream transcoding" method / apparatus that "analyzing a bitstream" and "outputting said bitstream", as claimed in the amended independent claims 1-2, 7-8, 11-16, and 18. Similarly, the combination also fails to teach a method that "analyzing an input bitstream" and "producing ... a transcoded bitstream", as recited in the amended independent claims 36-38.

Therefore, independent claims 1-2, 7-8, 11-16, 18, and 36-38 are not obvious over Shen in view of Florencio. Thus, the Applicants respectfully submit that claims 2, 7-8, 11-16, 18, 36-38 are patentable.

Claims 22, 28, 30, and 31 depend from claim 1. Therefore, claims 22, 28, 30, and 31 are patentable at least for the reasons stated above with respect to claim 1 and for the additional features recited therein.

Claim 3 depends from claim 2. Therefore, claim 3 is patentable at least for the reasons stated above with respect to claim 2 and for the additional features recited therein.

Claim 23 depends from claim 5. Therefore, claim 23 is patentable at least for the reasons stated above with respect to claim 5 and for the additional features recited therein.

Claim 24 depends from claim 7. Therefore, claim 24 is patentable at least for the reasons stated above with respect to claim 7 and for the additional features recited therein.

Claim 25 depends from claim 8. Therefore, claim 25 is patentable at least for the reasons stated above with respect to claim 8 and for the additional features recited therein.

Claim 26 depends from claim 9. Therefore, claim 26 is patentable at least for the reasons stated above with respect to claim 9 and for the additional features recited therein.

Claim 27 depends from claim 10. Therefore, claim 27 is patentable at least for the reasons stated above with respect to claim 10 and for the additional features recited therein.

In the Office Action, claims 9-10 and 17-18 have been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,445,739 issued to Shen et al. ("Shen"). The Applicants respectfully request reconsideration and allowance of the claims in view of the amendments presented herein and the following arguments.

In the Office Action, the Examiner asserted that "Shen discloses that the video signal processes luminance signals ... and further that the input signal also includes color signals to be quantized ... Accordingly, ... it would have been obvious for one of ordinary skill in the art to have the color information converted to chrominance information in order to reduce the number of quantization matrices need for the transcoding method". The Applicants respectfully submit that the Examiner is mistaken. Shen teaches a method of determining a quantization matrix to be applied to a block of data to be encoded/decoded, which can be a luminance or a chrominance block. Shen does not teach a method to convert luminance information so that the number of quantization matrices can be reduced. Quite opposite, Shen's teaching is to devise appropriate quantization matrices so that DCT block information to be coded can be reduced (when more DCT coefficients become zero after quantization). Therefore, there can be no motivation for She to suggest to "have color information converted to chrominance information to reduce the number of quantization matrices". In addition, as discussed above, Shen fails to teach a "bitstream transcoding" method that "analyzing a bitstream" as input and "output said bitstream" as output, as claimed in the amended independent claims 9, 10, 17, and 18.

Therefore, independent claims 9-10 and 17-18 are not obvious over Shen as modified in a manner suggested by the Examiner. Thus, the Applicants respectfully submit that claims 9-10, 17, and 18 are patentable.

Claims 20-21 have been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,445,739 issued to Shen et al. ("Shen") in view of U.S. Patent No. 6,320,600 issued to Smith et al. ("Smith"). The Applicants respectfully request reconsideration and allowance of the claims in view of the amendments presented herein and the following arguments.

In the Office Action, the Examiner correctly pointed out that "Shen fails to disclose switching each time a GOP header is input" and asserted that "Smith discloses that for transcoding, it is known to use the GOP header of an input sequence to store time code information in order to aid in switching in video image processing". Smith discloses a web-based video-editing system (see Abstract) that utilizes various types of meta information encoded with data itself to determine how to facilitate video editing functionalities (see col. 10, lines 35-45). It is commonly known that a video editing tool allows decoded video information to be displayed and manipulated in an uncompressed domain.

The Applicants respectfully submit that Shen teaches a method of determining a quantization matrix which is applied to quantize one or more blocks of data to be encoded/decoded. Quantization of data blocks relates to production of data to be coded and bears no relation to meta information such as GOP header to be coded with data providing descriptive information related to the coded data (e.g., width, height of an image, etc.). Even though a quantization matrix itself may be treated as meta data, processing quantization information as disclosed in Shen not only bears no relationship with such meta information as GOP header but also has no motivation to combine with Smith to incorporate such meta information.

Since Shen does not and has no motivation to suggest to combine with Smith, a prima facie case of obviousness can not be established. In addition, even if combined, the combination of Shen and Smith does not remedy the deficiency of Shen because the combination still fails to teach a "bitstream transcoding" method / apparatus that "analyzing a bitstream" as input and "outputting said bitstream" as output, as claimed in the amended independent claim 11. Therefore, independent claim 11 is not obvious over Shen in view of Smith. Thus, the Applicants respectfully submit that claim 11 is patentable in light of the combination of Shen and Smith. Claims 20 and 21 depend from claim 11. Therefore, claims 20 and 21 are patentable at least for the reasons stated above with respect to claim 11 and for the additional features recited therein.

Claim 29 has been rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,445,739 issued to Shen et al. ("Shen") in view of Florencio as applied to claim 22 and further in view of Smith. The Applicants respectfully request reconsideration and allowance of the claims in view of the amendments presented herein and the following arguments.

As discussed above with respect to claim 22 (which claim 29 depends from), Shen does not and has no motivation to suggest the combination of Shen and Florencio and, even when combined, the combination does not remedy Shen's deficiency because the combination fails to teach a "bitstream transcoding" method that "analyzing a bitstream" as input and "outputting said bitstream" as output. In addition, as discussed above, Shen does not and has no motivation to suggest a combination with Smith either. Furthermore, even if combined with both Florencio and Smith, the combination of all three does not remedy the deficiency of the combination of two between Shen and Florencio because the combination of three still does not teach a "bitstream transcoding" method that "analyzing a bitstream" as input and "outputting said bitstream" as output, as claimed in independent claim 1.

Therefore, independent claim 1 is not obvious over Shen in view of Florencio and further in view of Smith. Thus, the Applicants respectfully submit that claim 1 is patentable in light of the combination of Shen, Florencio, and Smith. Claim 22 depends from claim 1. Therefore, claims 22 is patentable at least for the reasons stated above with respect to claim 1 and for the additional features recited therein. Claim 29 depends from claim 22. Therefore, claims 29 is patentable at least for the reasons stated above with respect to claim 22 and for the additional features recited therein.

Conclusion

Accordingly, it is believed that all pending claims are now in condition for allowance. Applicants therefore respectfully request an early and favorable reconsideration and allowance of this application. If there are any outstanding issues which might be resolved by an interview or an Examiner's amendment, the Examiner is invited to call Applicants' representative at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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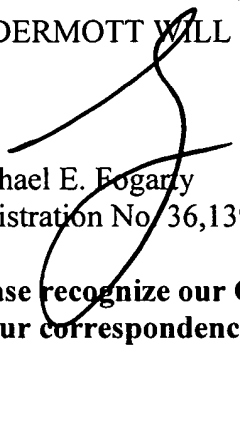

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